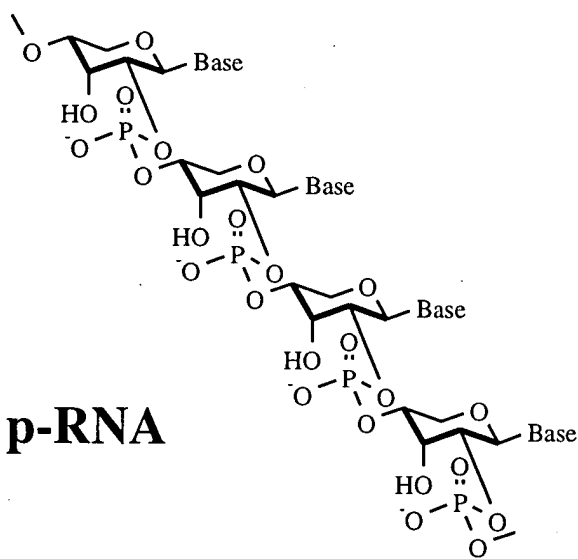


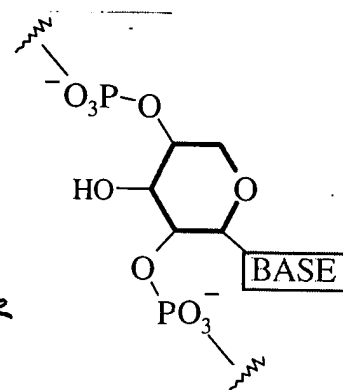
Figure 1 - p-RNA Structure

Pyranosyl-RNA



p-RNA

p-RNA
unit
structure



Advantageous properties:

Watson-Crick pairing mode exclusively

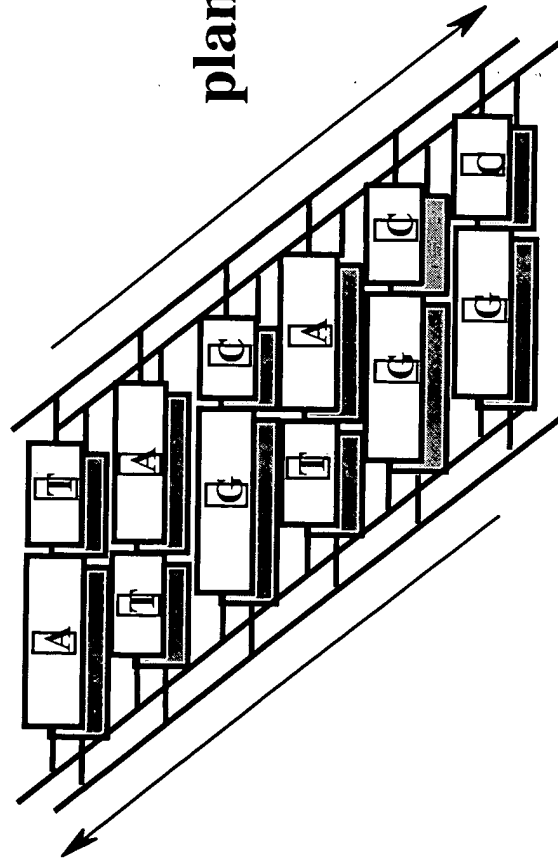
Antiparallel strand orientation exclusively

- Duplexes *more stable* than in DNA or RNA
- Duplexes have a *quasi-linear* ladder structure
- Pairing is *enantioselective*
 - Potential to replicate *without enzymes*
(thus prebiotic ancestor to RNA?)
 - No pairing with DNA or RNA

662133-0264250

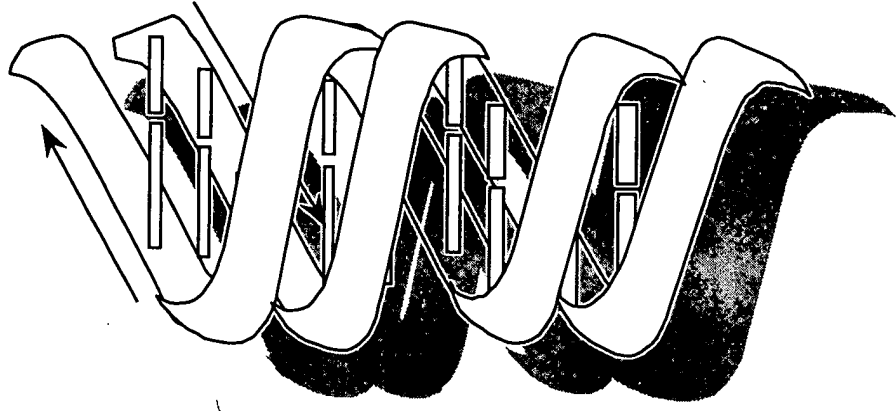
Figure 2- p-RNA Planar and DNA Helical Structures

p-RNA



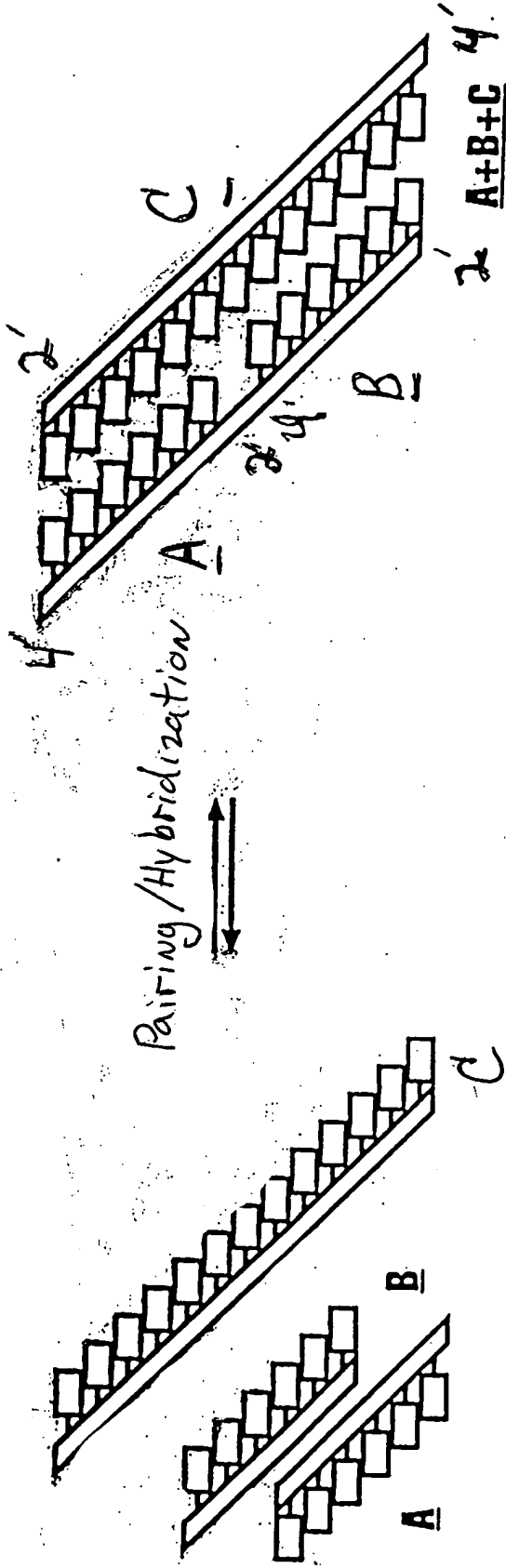
planar

DNA / RNA



helical

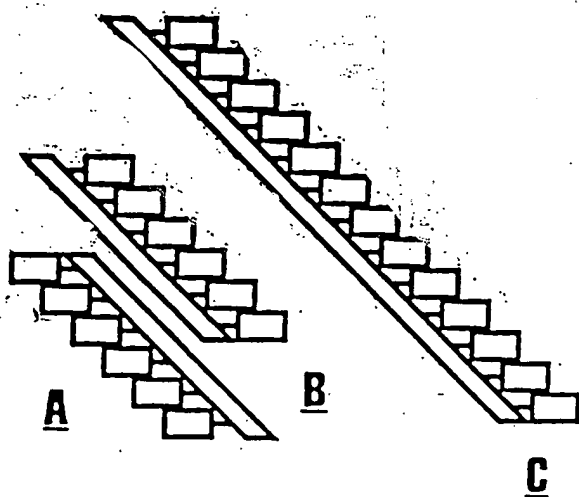
Figure 3- p-RNA Components A, B, and C



p-RNA Components
A, B, and C
un-paired

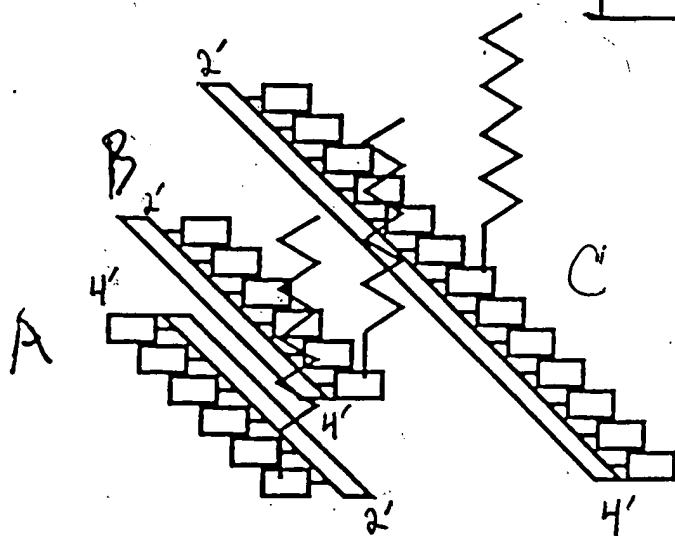
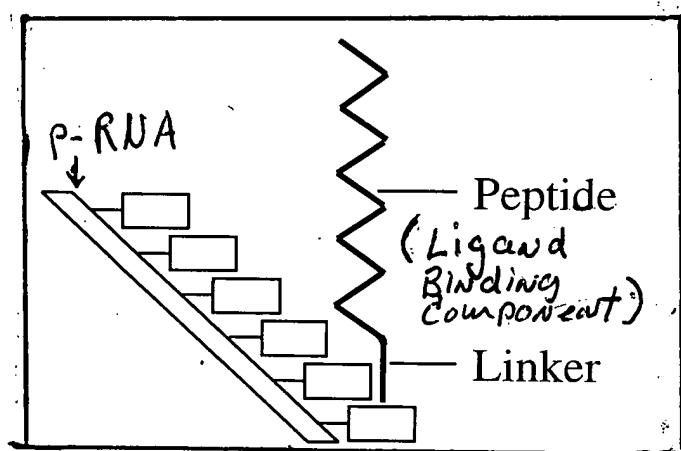
p-RNA Components
A, B, and C
paired or hybridized

Figure 4- p-RNA Peptide Derivatized A, B, + C Components



← p-RNA Components
A, B, and C
(Programmable Pairing Components)

Linking of
peptide library
with p-RNA
Components A, B, + C



← p-RNA Peptide
derivatized
A, B, and C
Components

(Intermolecular Ligand
Binding Components)

09374330-001309

Figure 5- Supramolecular Complex Formation with Ligand Molecule

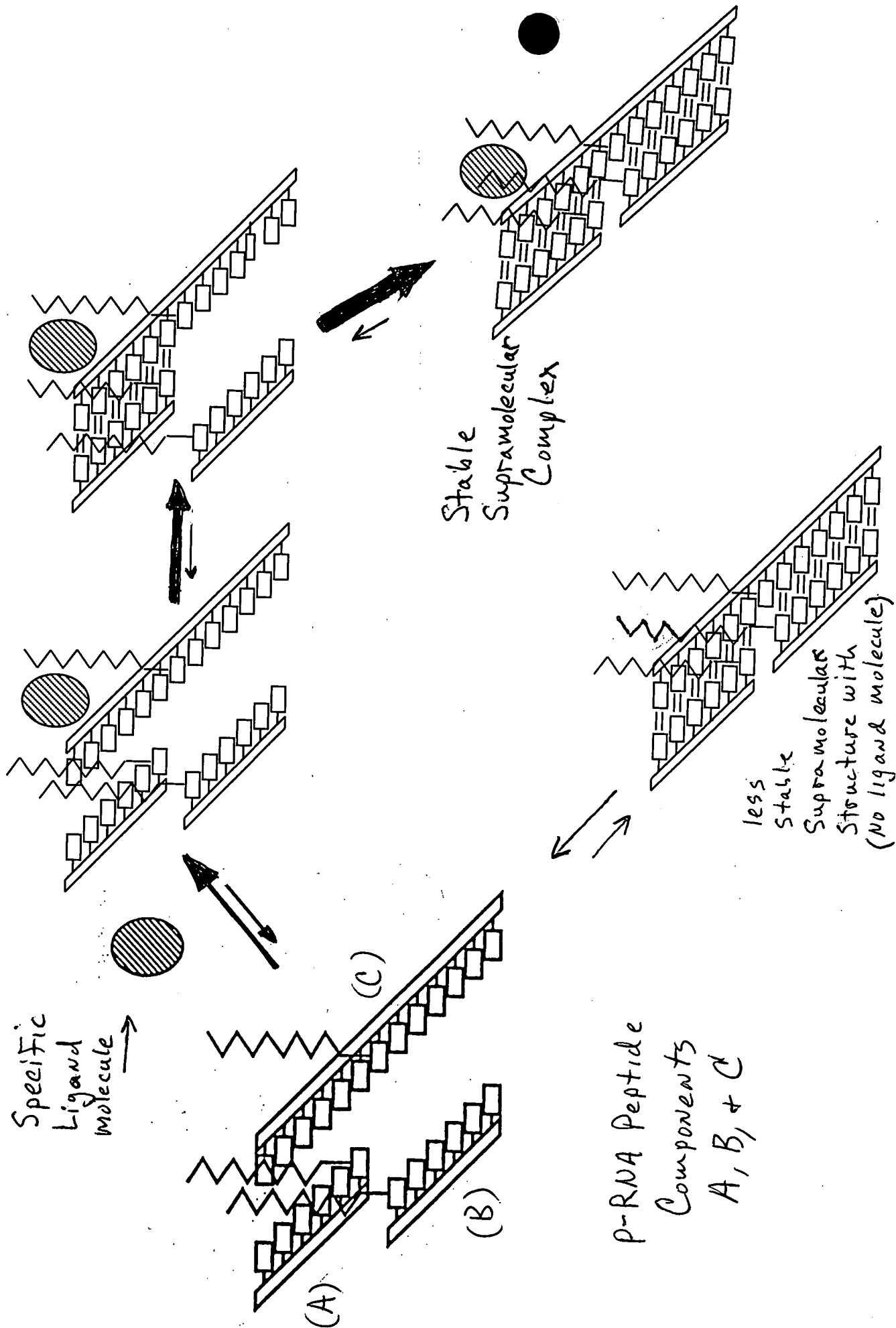
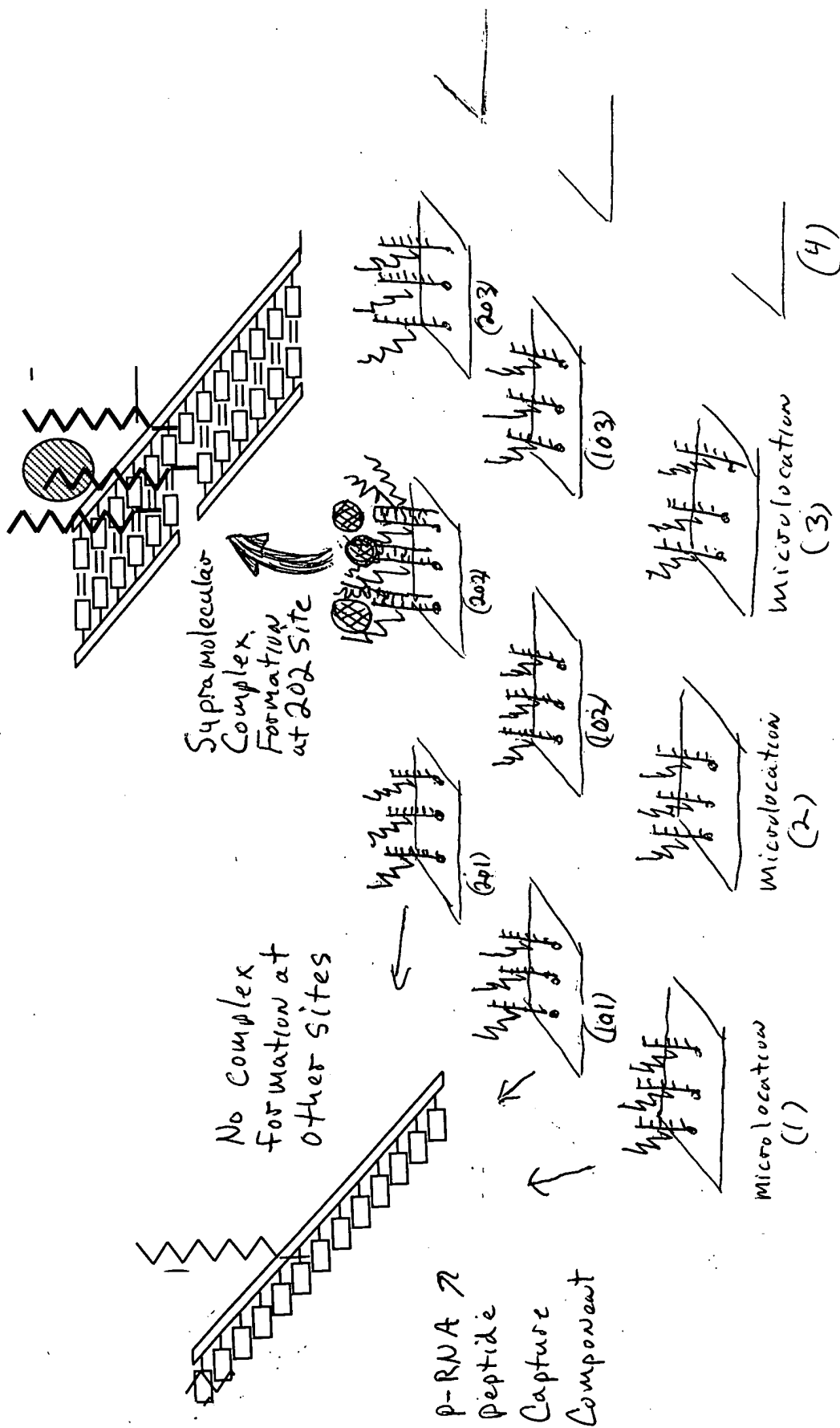


Figure-6 ELOC Process and Supramolecular Complex on Array



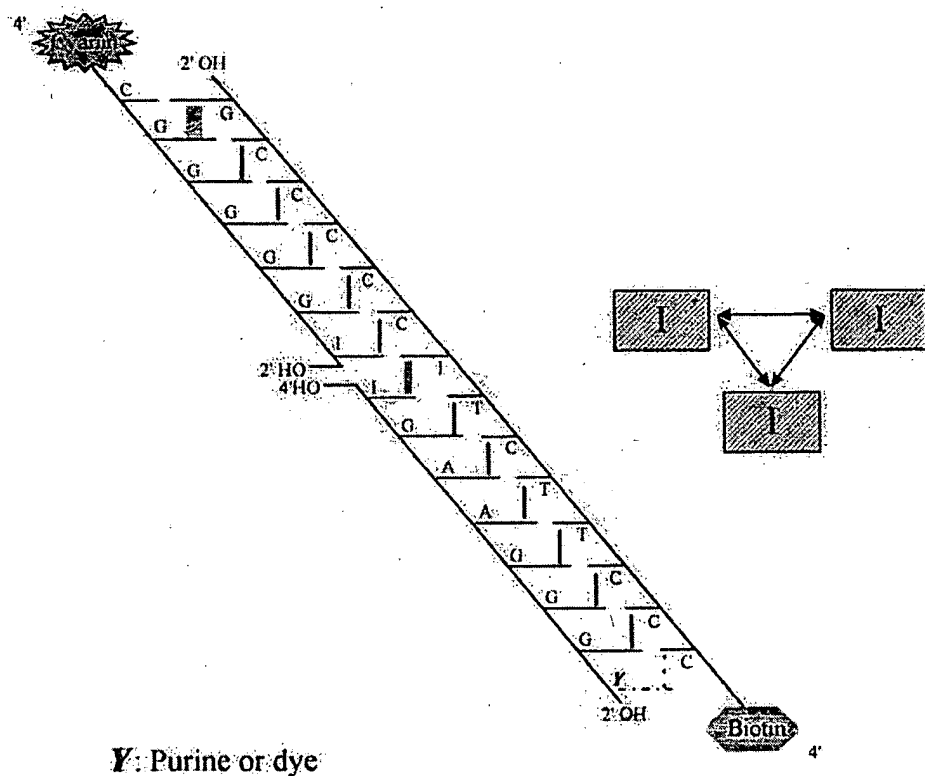
Portion of Microelectronic ELOC Chip

Figure 7- Fully hybridized 7-mer p-RNA A, 7-mer p-RNA B, and complementary capture p-RNA C.

Oligo 90: 4' IGAAGGGY 2'

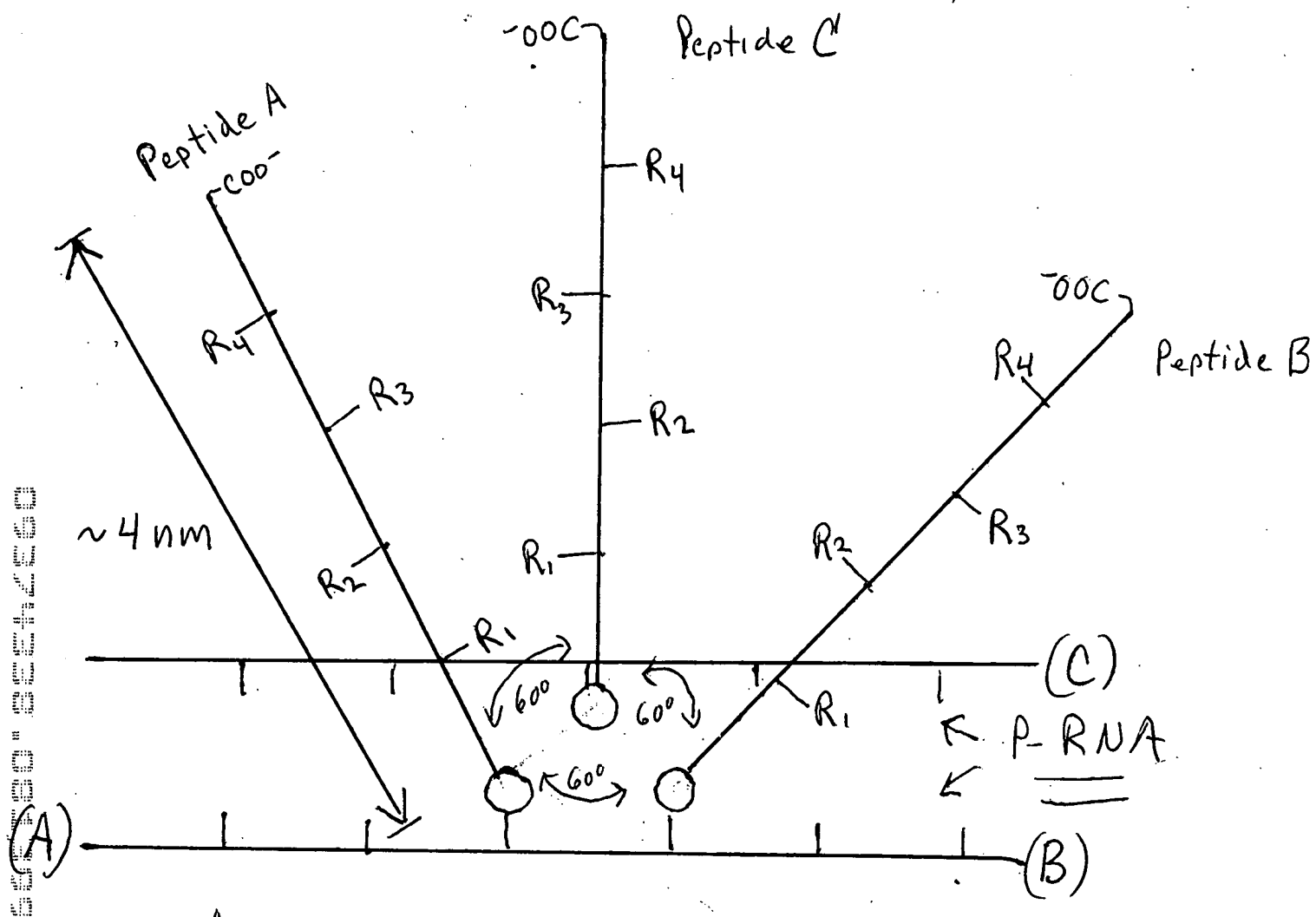
Oligo Cy91: 4' Cyanine-CGGGGGI 2'

Oligo Biot92: 4' Biotine-CCCTTCTICCCCCG 2'



007433-00159

Figure 8- Dimensional Geometry of Hexamer Peptide Triad



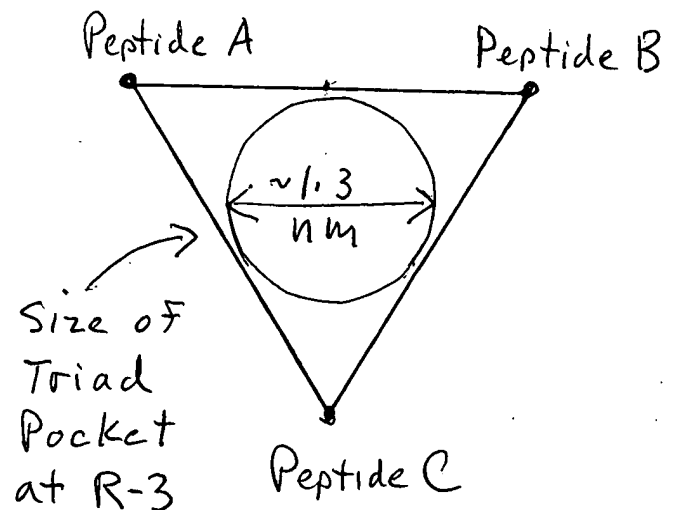
Amino Acid R Groups

$R_1 \sim 0.6 \text{ nm}$

$R_2 \sim 0.96 \text{ nm}$

$R_3 \sim 1.3 \text{ nm}$

$R_4 \sim 1.7 \text{ nm}$



552733 824260

Figure 9 - p-RNA-Peptide "Triad" Suprastructure
Complex Binding a Biotin Molecule

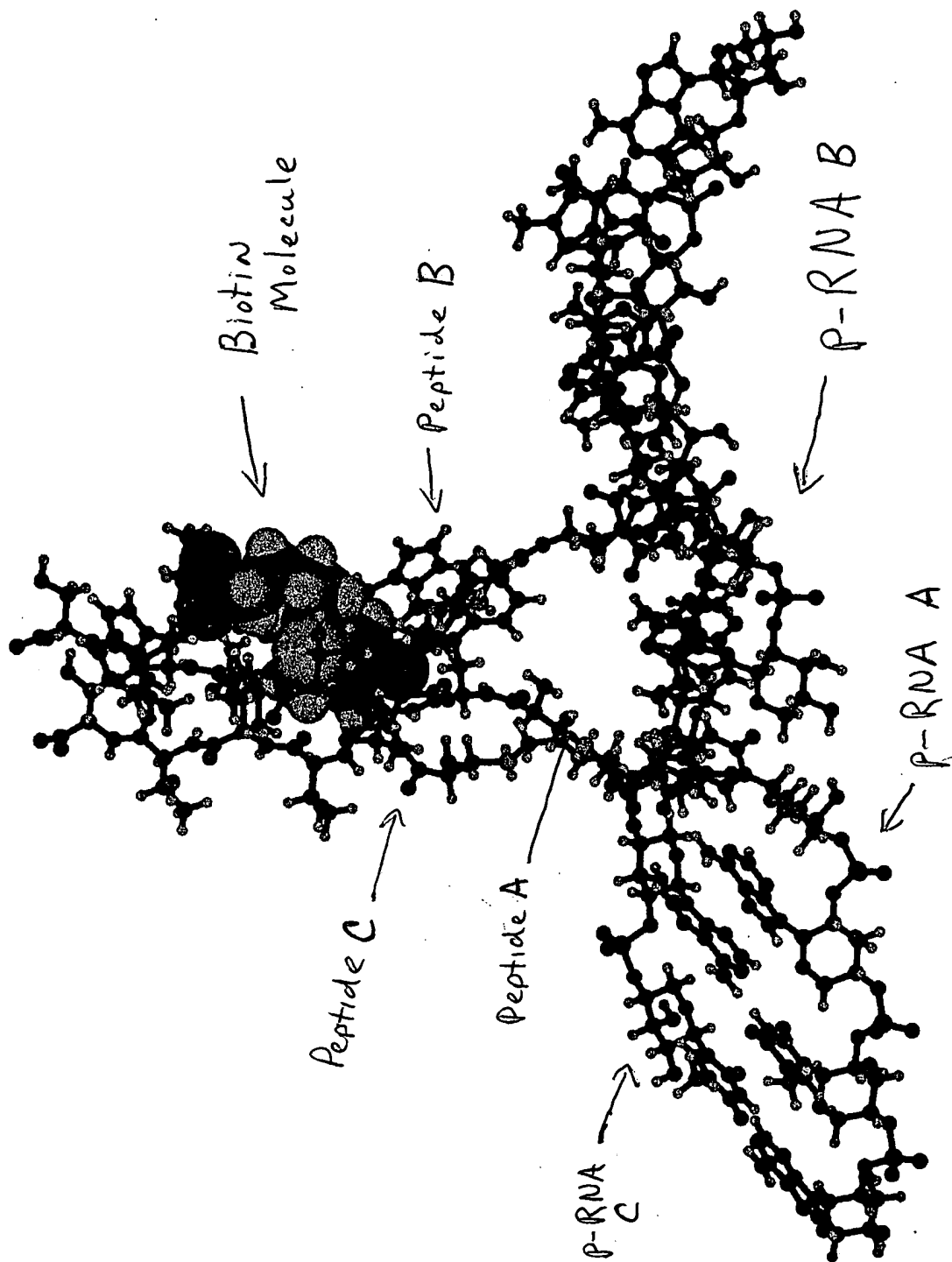
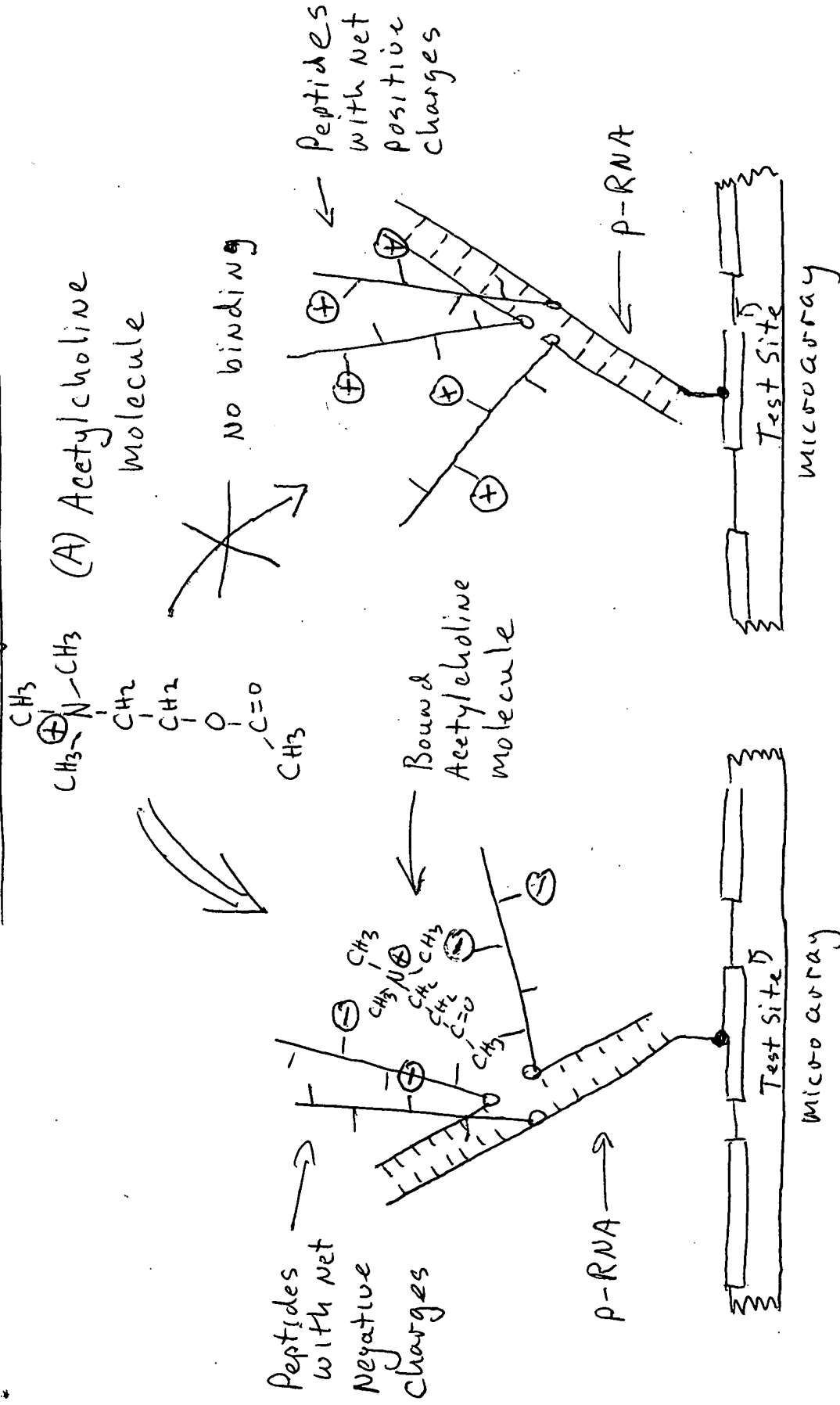


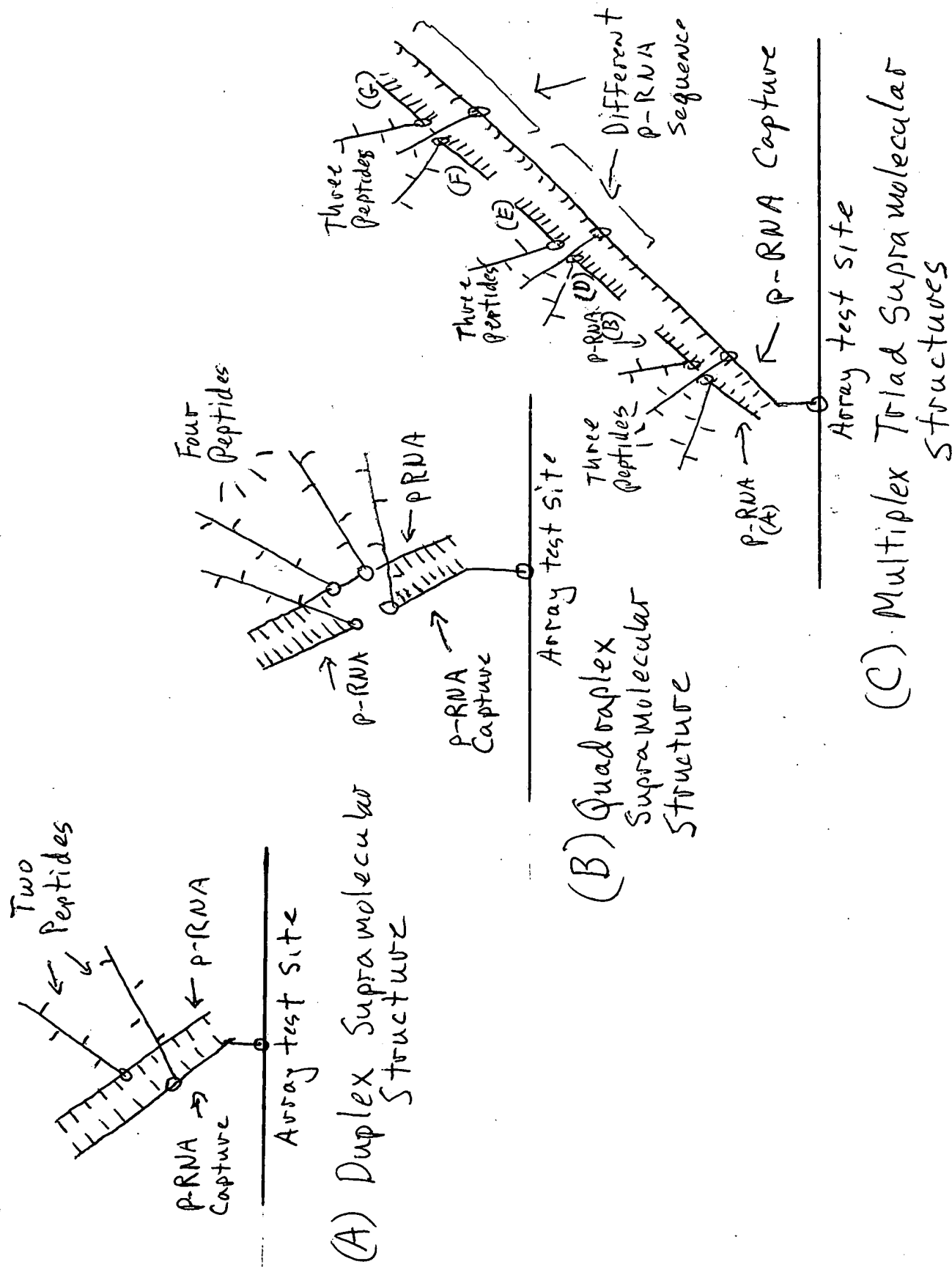
Figure 10 - Favorable and Unfavorable Peptide Triads for Binding Acetylcholine



(B) Favorable Peptide Triad Binding Site for Acetylcholine

(C) Unfavorable Peptide Triad Binding Site for Acetylcholine

Figure 11 - Other Supramolecular Structures



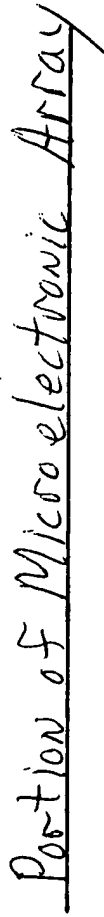
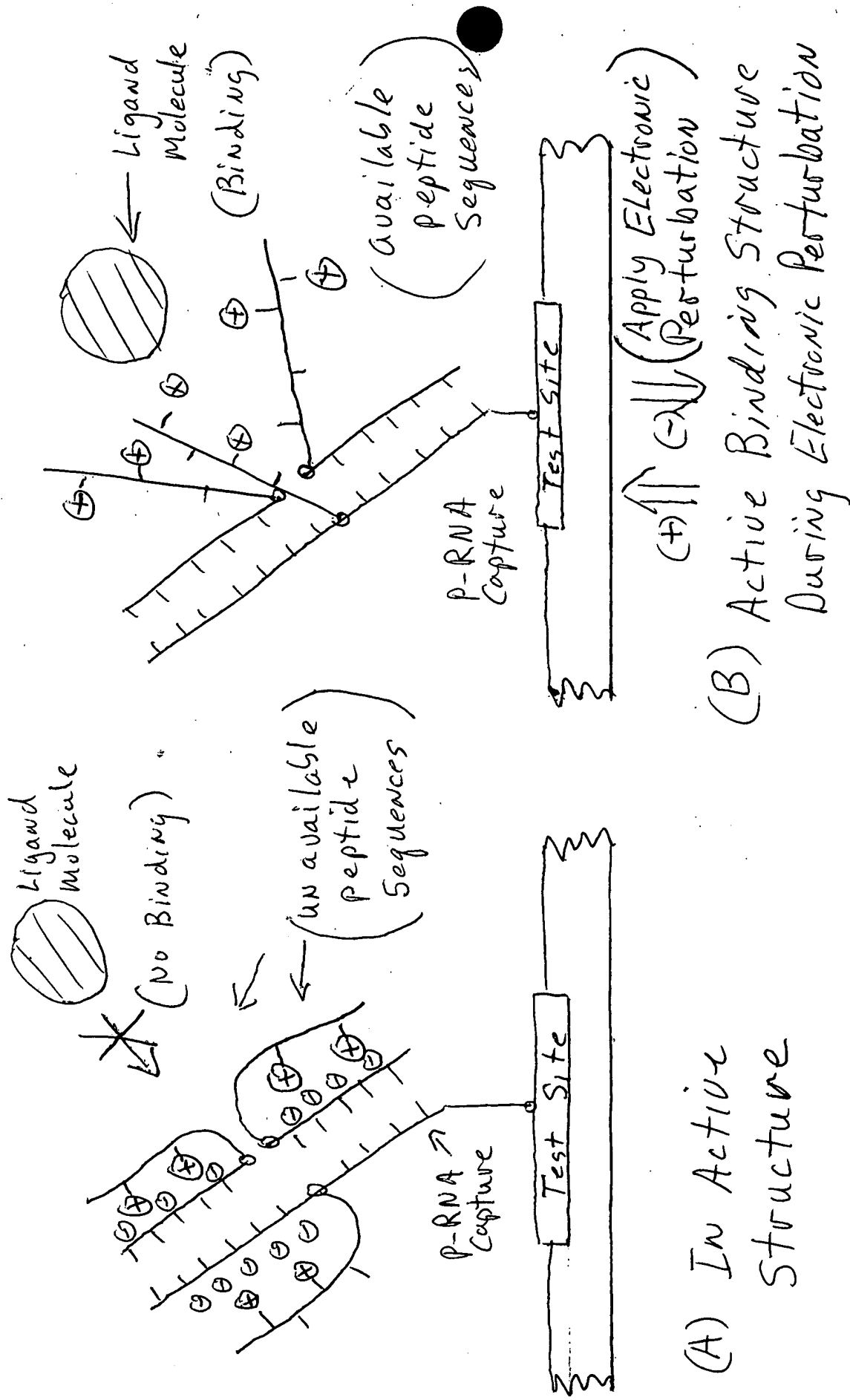
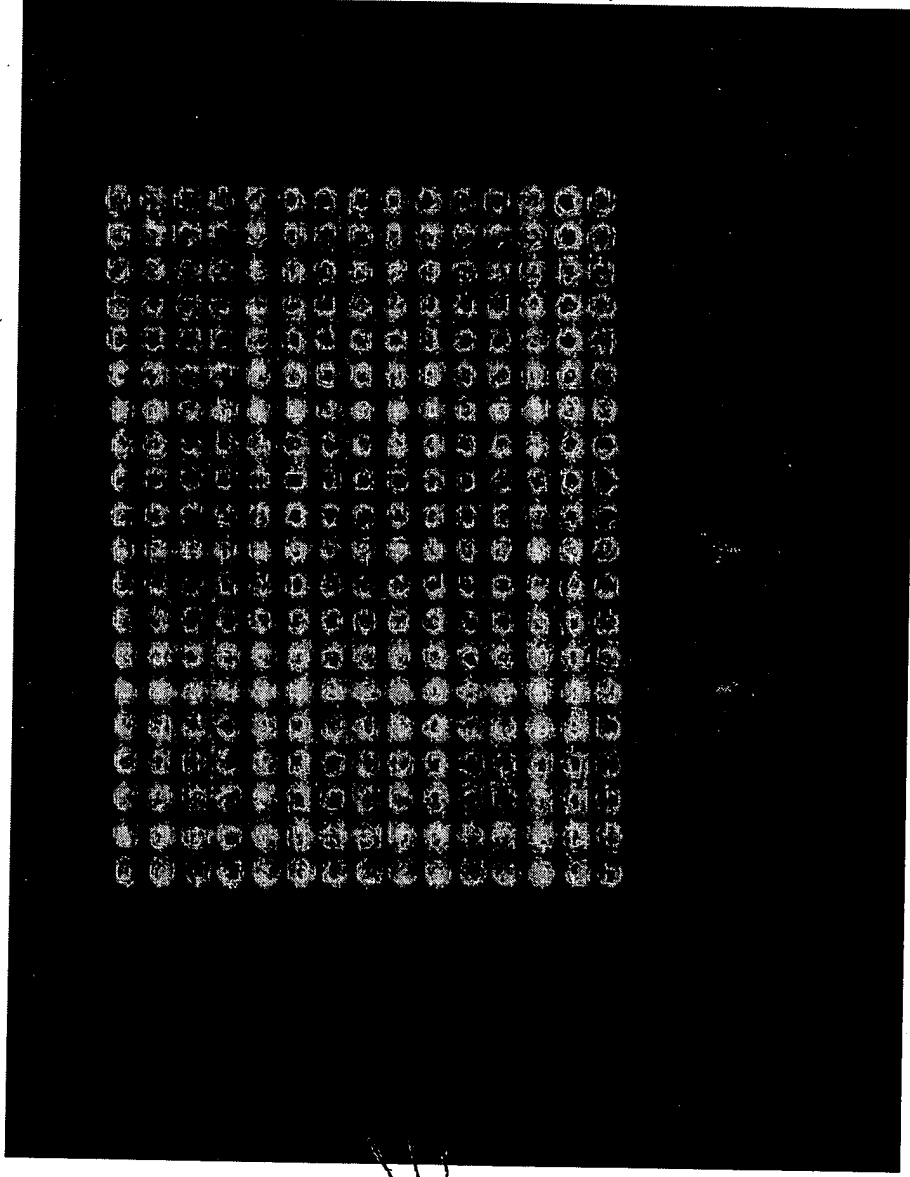


Figure 13 - Electronic Perturbation to Improve Ligand Binding



65E180" 6E42E60

Figure 14- Specific p-RNA Hybridization on
10,000 Site Microelectronic Array



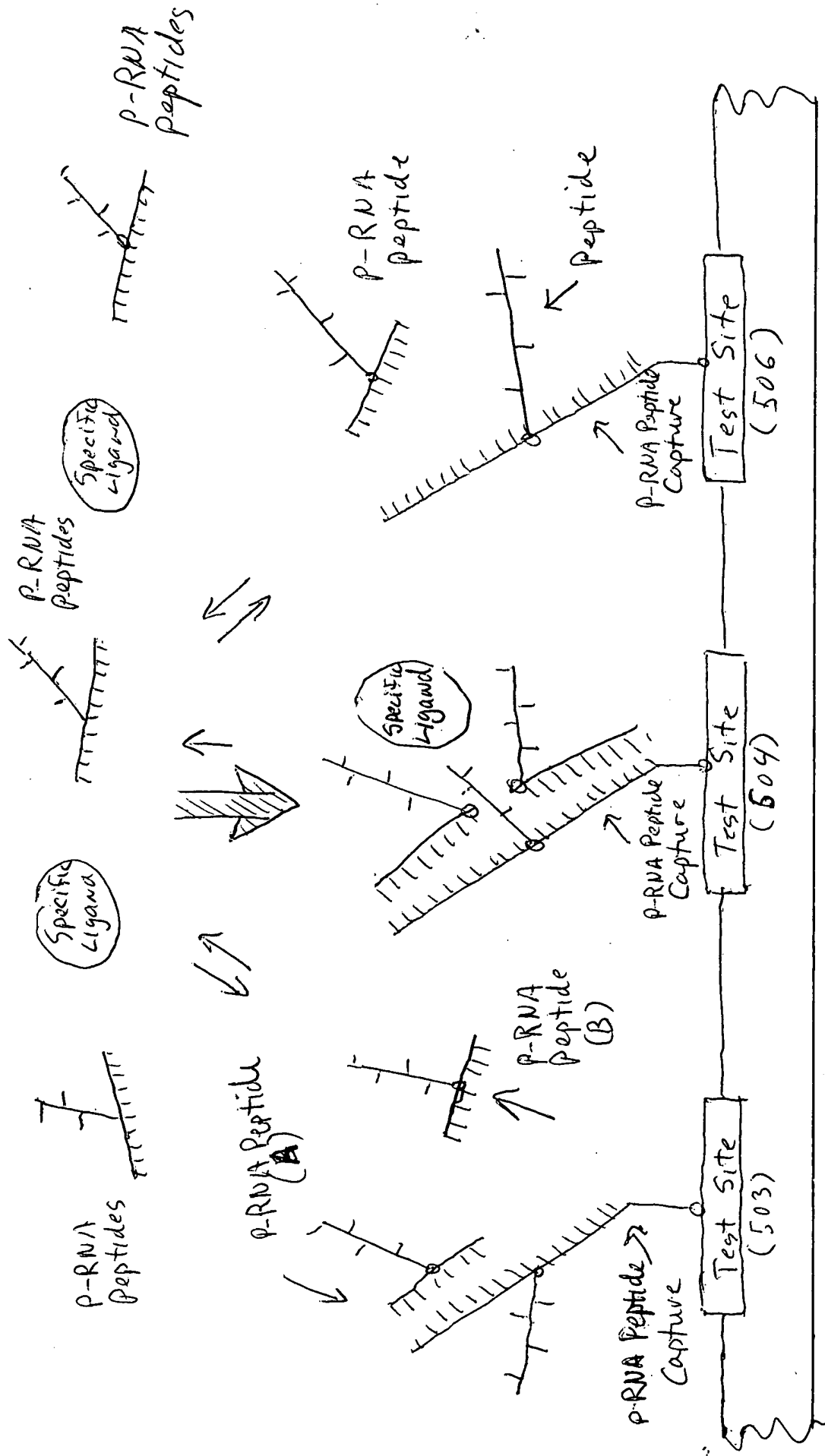
Specific p-RNA
Capture (92-)
Hybridized with
p-RNA 91-CY3

Non-Specific
Capture p-RNA
72

30 Micro
test Sites

Portion of 10,000 Site Microelectronic
Array

Figure 15- ELOC₅₀₀ Format 150 Transition
Dynamic Equilibrium Triad Formation



Portion of Microelectronic Array

Figure 16 - ELCD Format 2 - Homogeneous
 Triad Formation Process

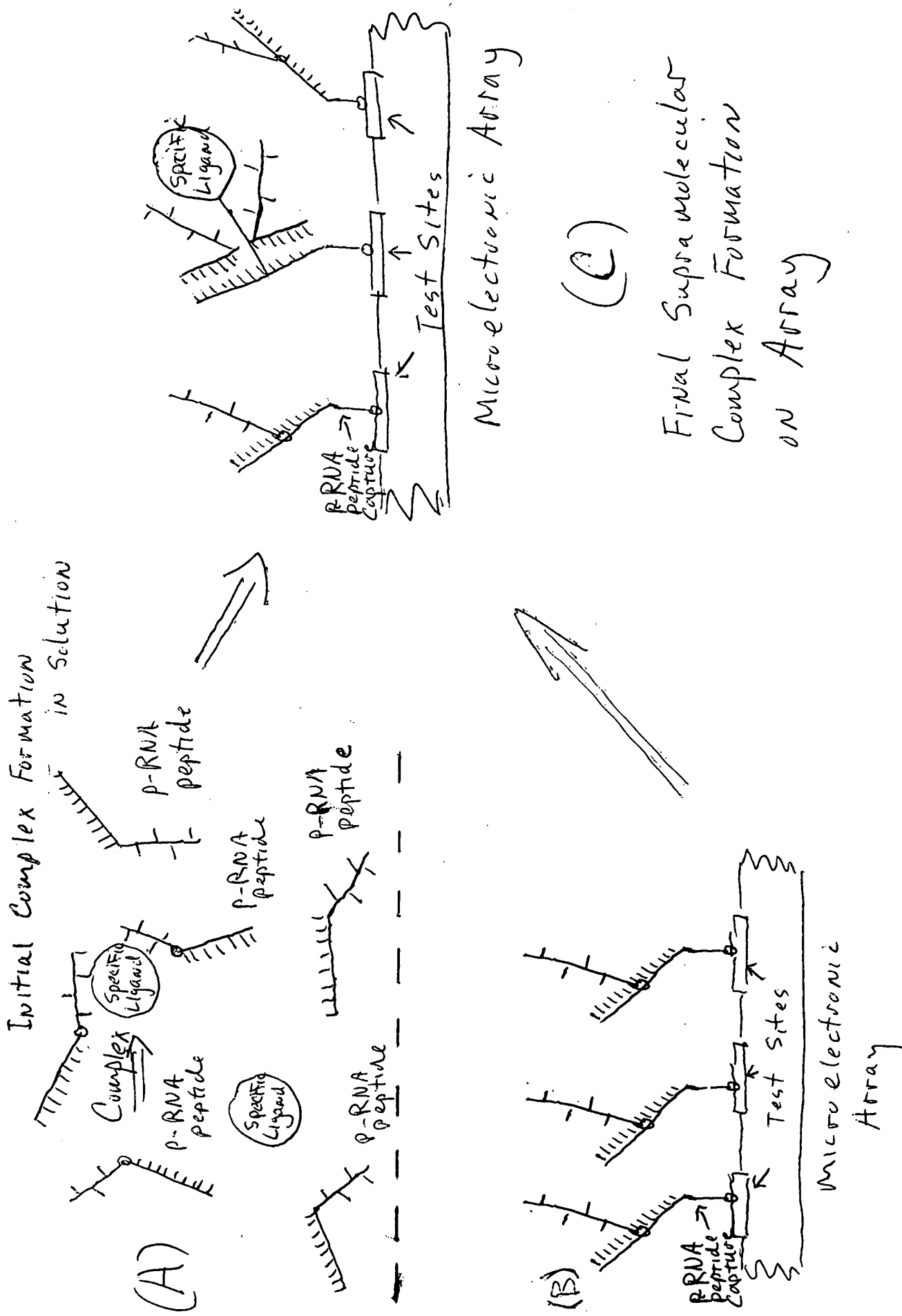
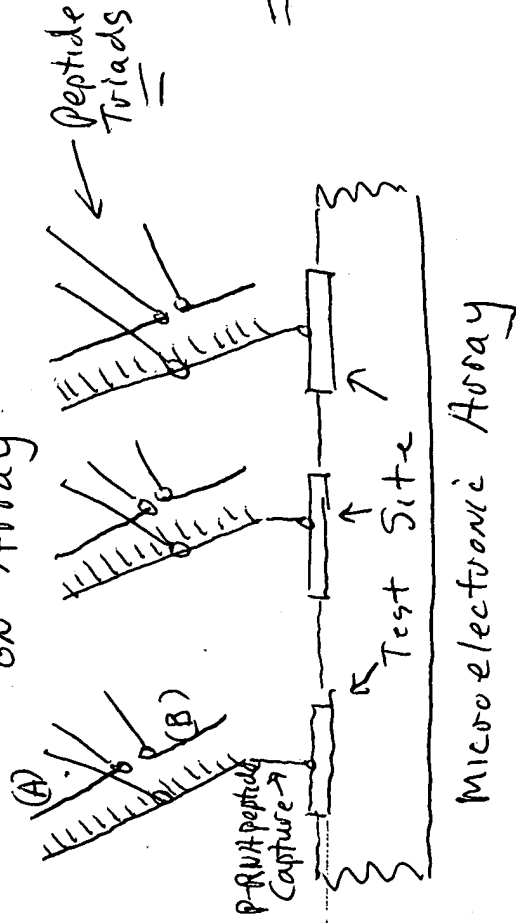


Figure 17- EL0C' Format 3 - Heterogeneous Triad Formation Process

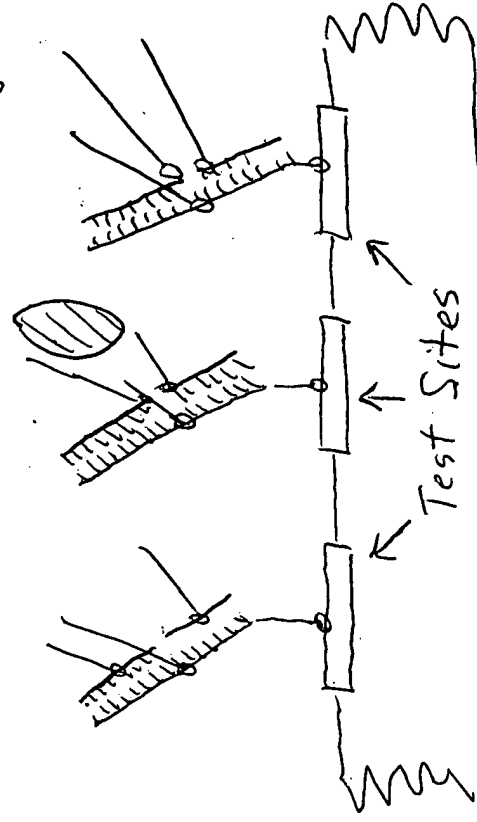
(A) Initial Formation of all supra molecular Structures on Array



Add Specific Ligands



Complex Formation with Specific Ligand



(B) Secondary Formation of Supra molecular Complexes on Array

Figure 18 - Multiplex P-RNA-Peptide Triads As Synthetic Antibodies For Immuno Assay

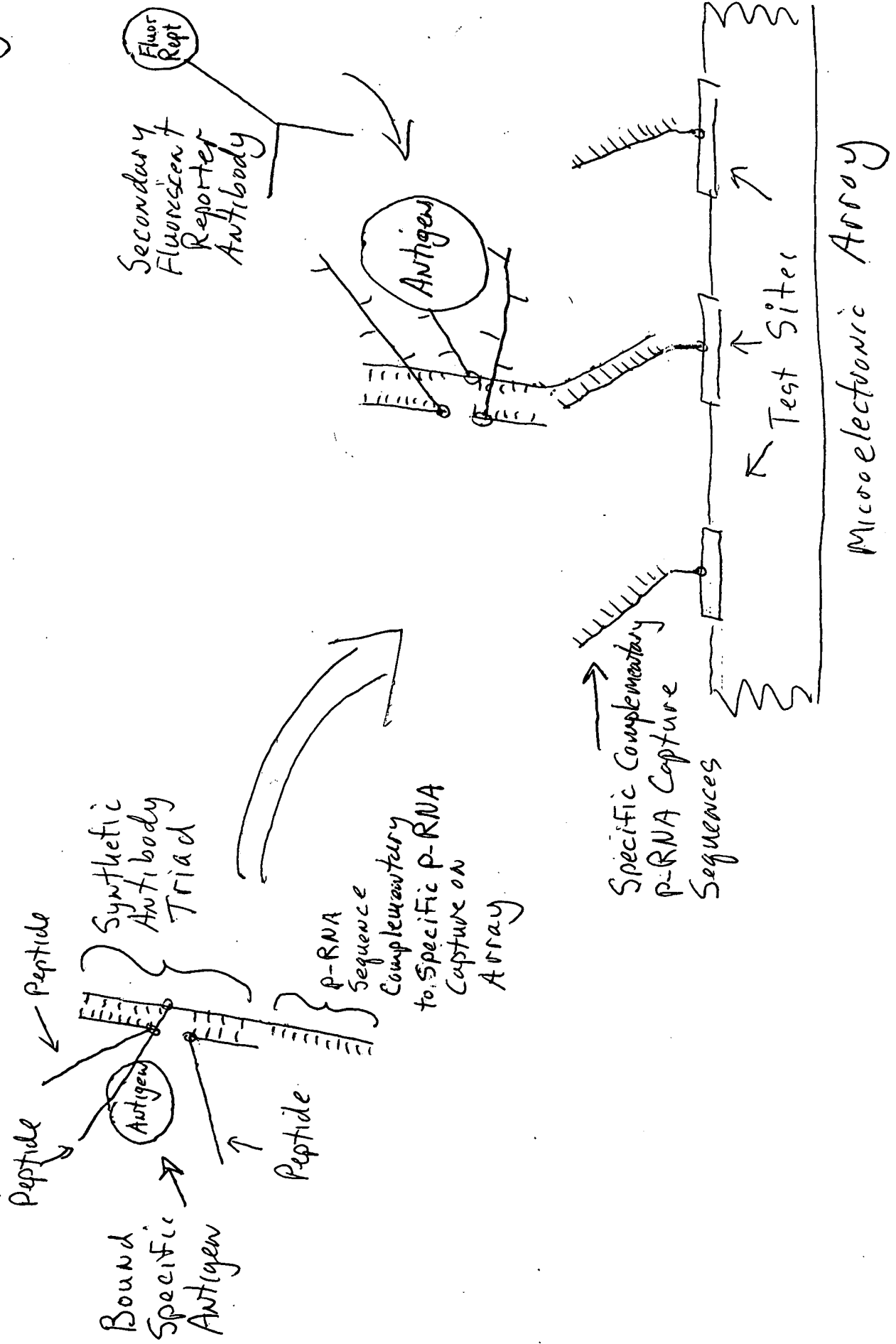
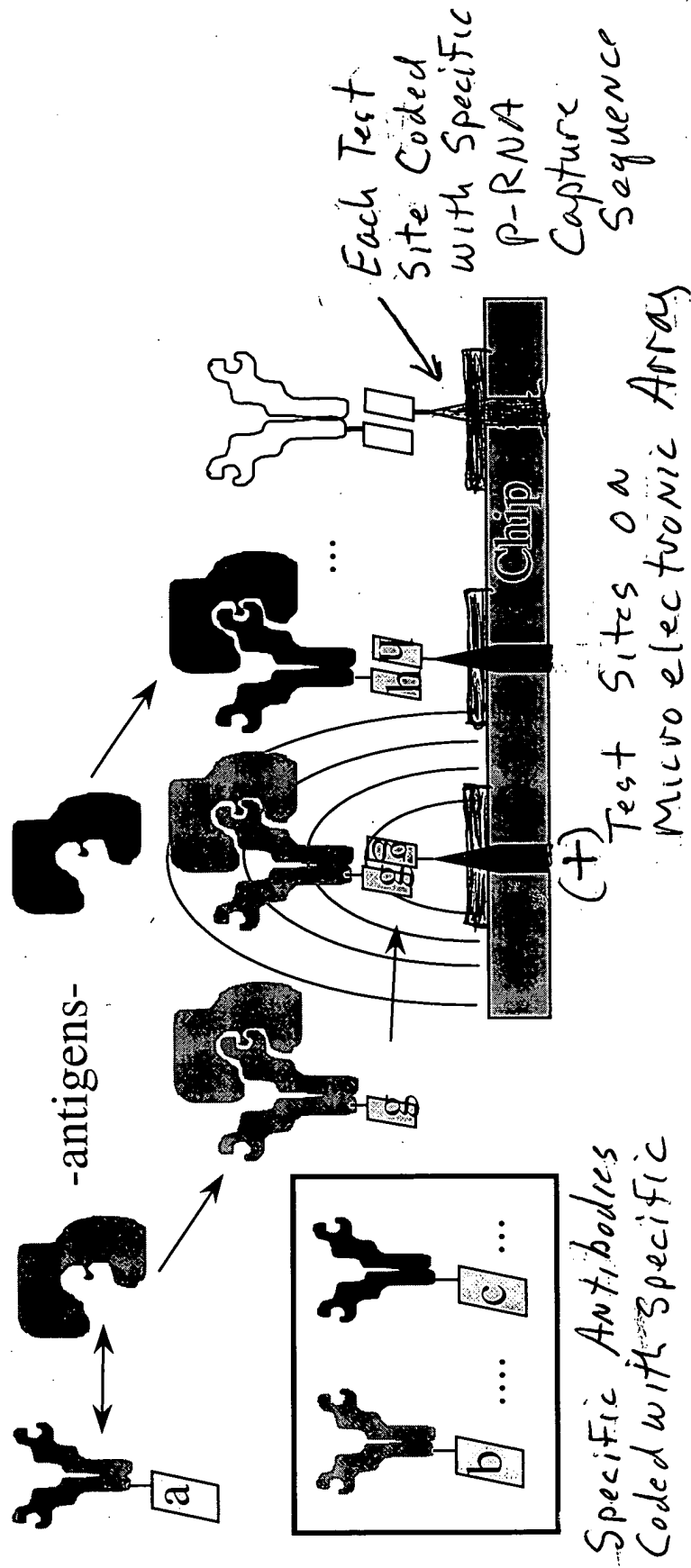


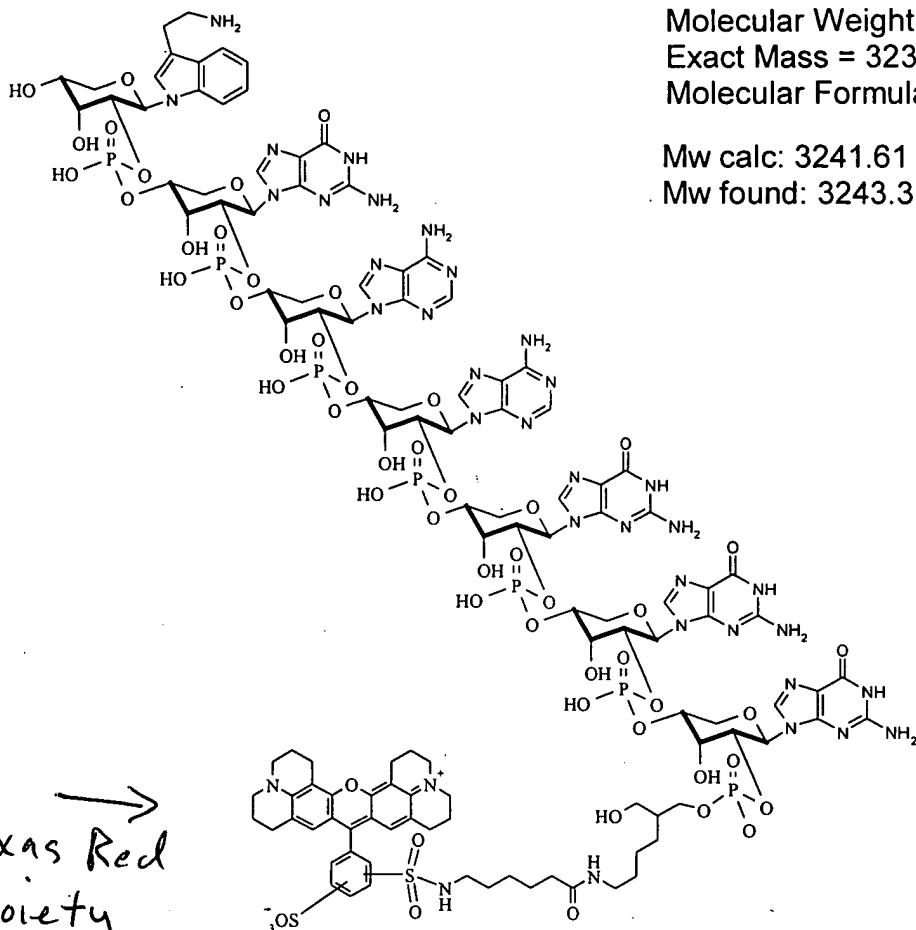
Figure-19 - Modular Immuno Assay Using p-RNA
Antibody Conjugates on Microelectronic
Array



Specific Antibodies
Coded with Specific

Complementary p-RNA
Sequences to those
Coded on the Array

Figure 20 - Structure and Mass Spec for TR-90-P-RNA Conjugate

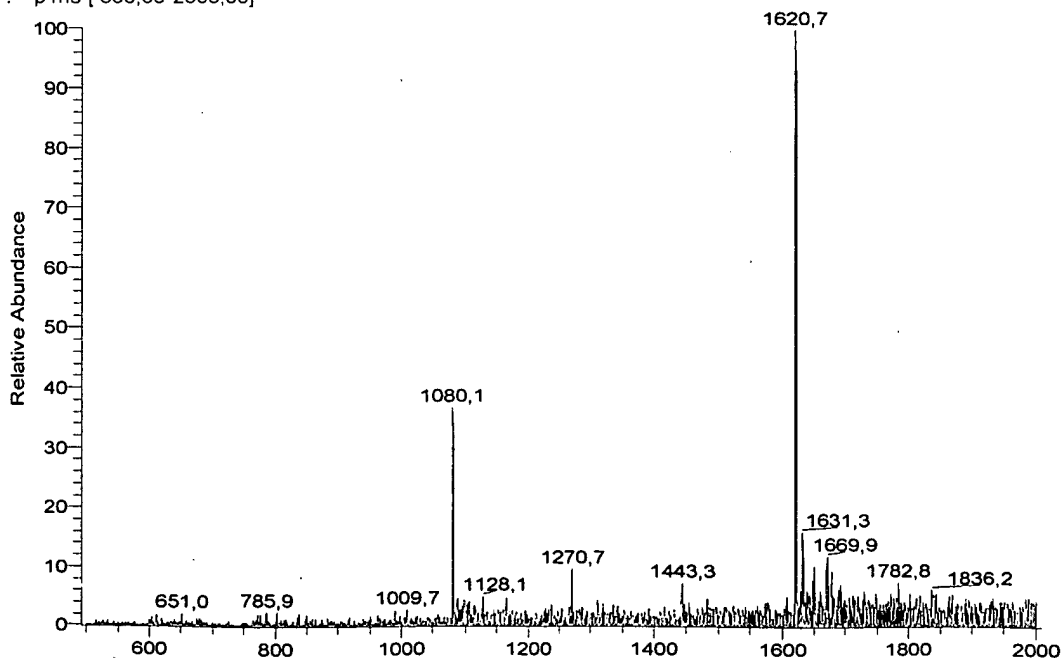


Molecular Weight = 3241.61
Exact Mass = 3239.73
Molecular Formula = C₁₁₉H₁₄₆N₃₆O₅₅P₇S₂

Mw calc: 3241.61
Mw found: 3243.3 ± 0.5 (error~ 0.4%)

→
Texas Red
Moiety

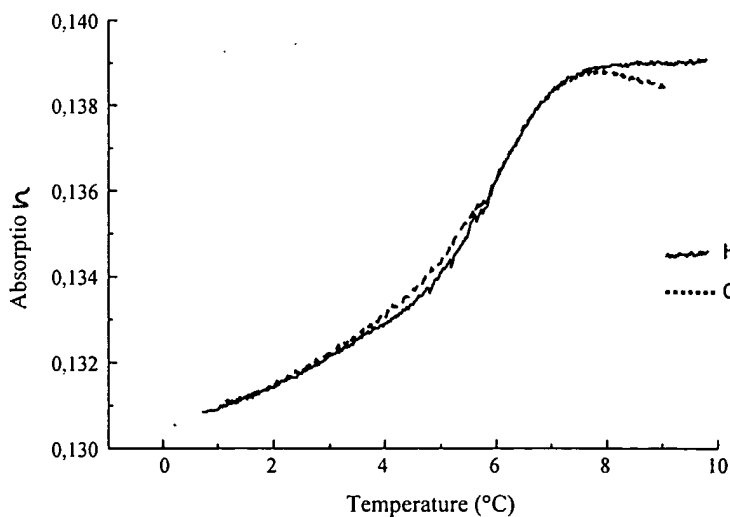
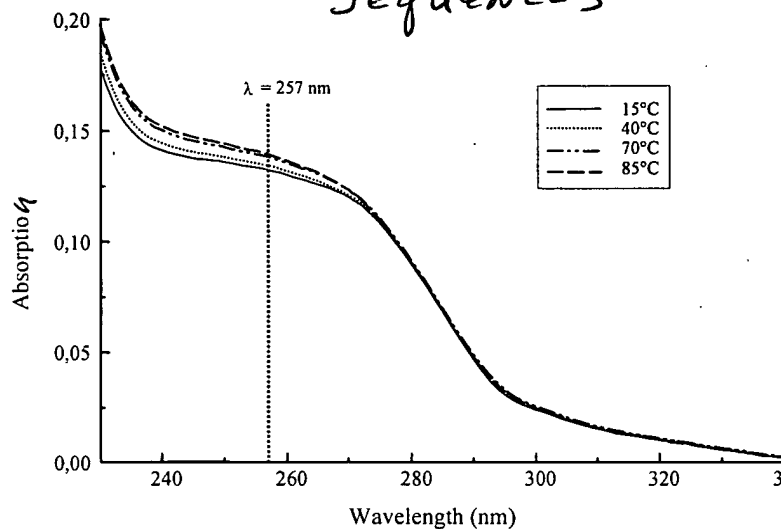
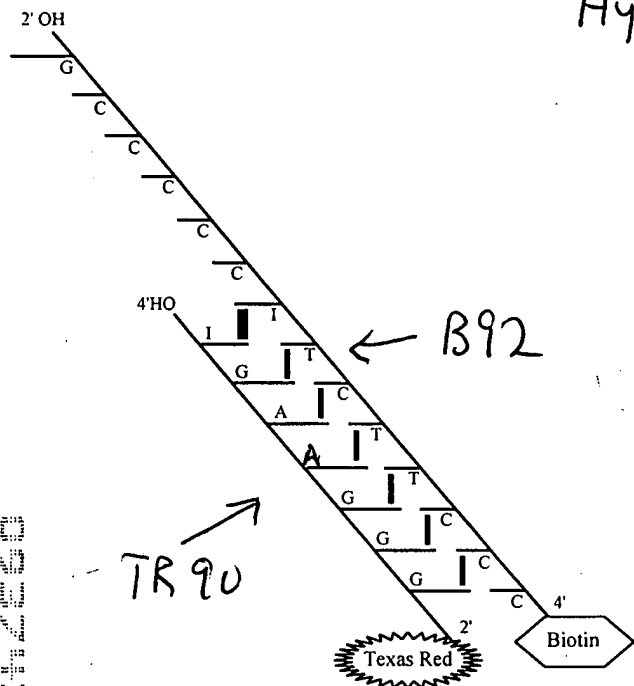
990566es1#13-15 RT: 0.49-0.56 AV: 3 NL: 6.96E3
F: - p ms [500.00-2000.00]



Oligo TR90: 4' IGAAGGG-TexasRed 2'

Oligo B92: 4' Biotin-CCCTTCTICCCCCG 2'

Figure 21- Structure for Hybridized TR-90 and B92 Sequences

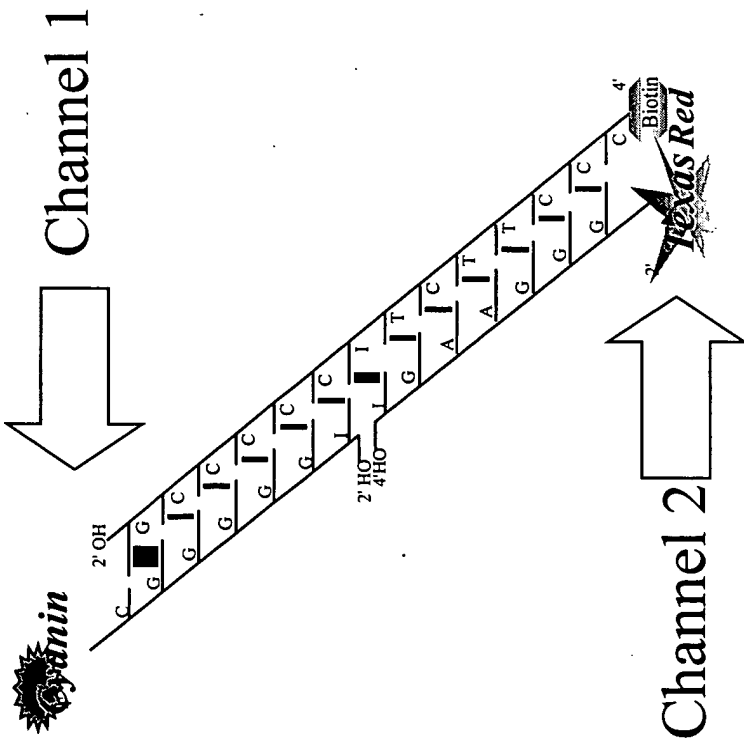


$T_m = 59^\circ\text{C}$
 Tris/HCl 0.01M ; pH 7
 0.15 M NaCl
 $c = 5\ \mu\text{M} + 5\ \mu\text{M}$

Oligo TR-90: 5'-ICGAGGG-TexasRed 2'

Oligo Cy3-91: 4' Cyanine3-CGGGGI 2'

Oligo Biot-92: 4' Biotin-CCCTTCTICCCCCG 2'



$T_m = 61^\circ\text{C}$
 Tris/HCl 0.01M; pH 7
 0.15 M NaCl
 $c = 5 \mu\text{M} + 5 \mu\text{M} + 5 \mu\text{M}$

Figure 2.2
 Structure for
 Hybridized TR90,
 Cy3-91, and B92
 p-RNA Conjugates

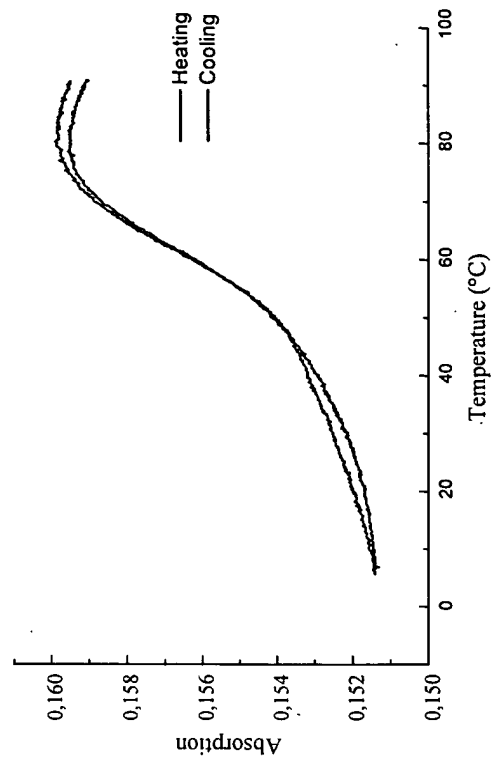
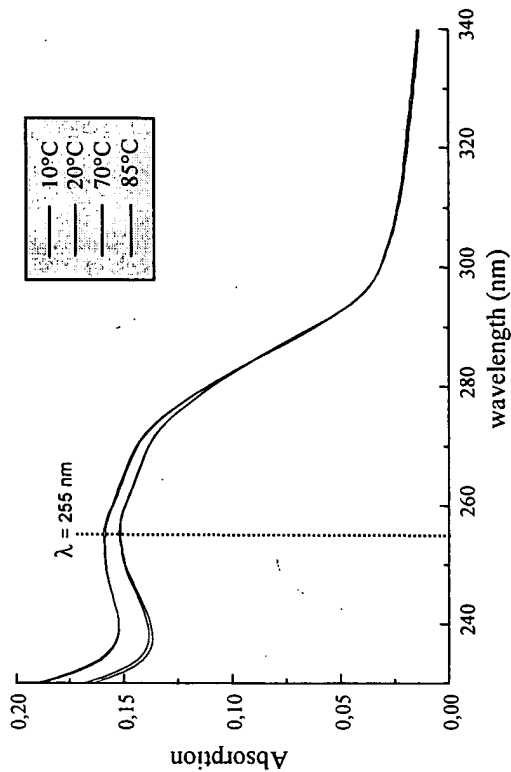
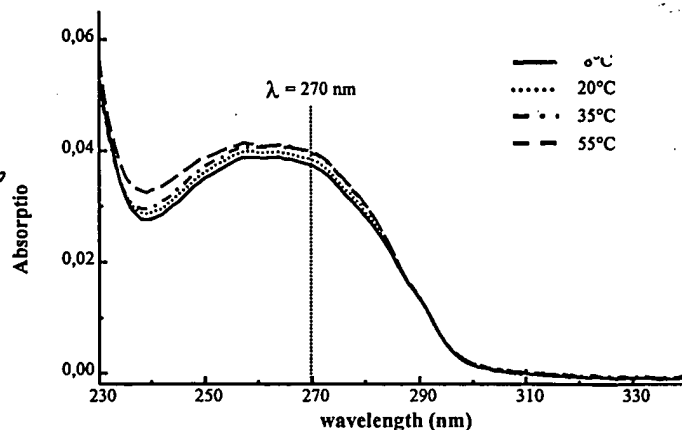
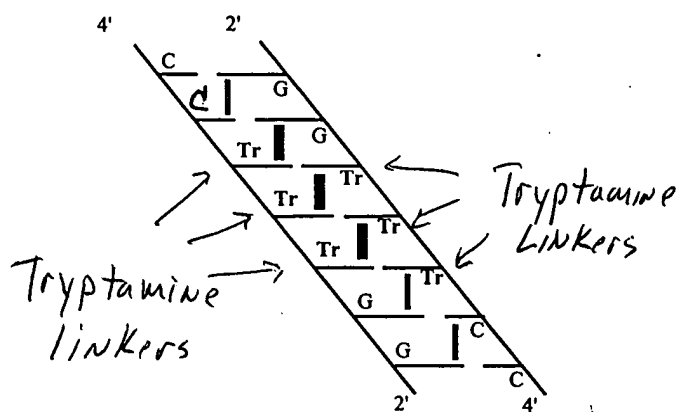
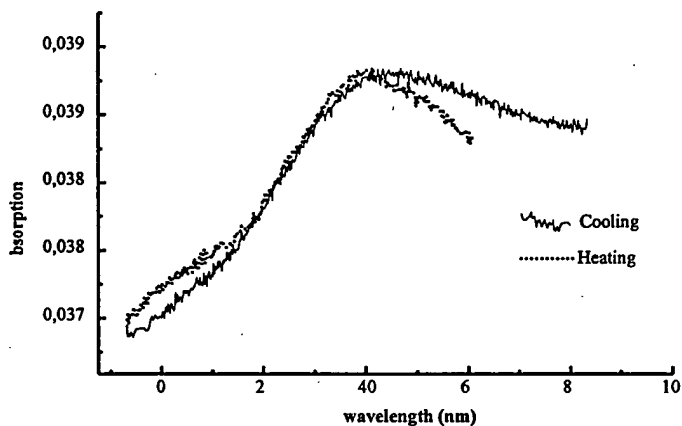


Figure 23- p-RNA Sequence with Multiple Tryptamine Linkers

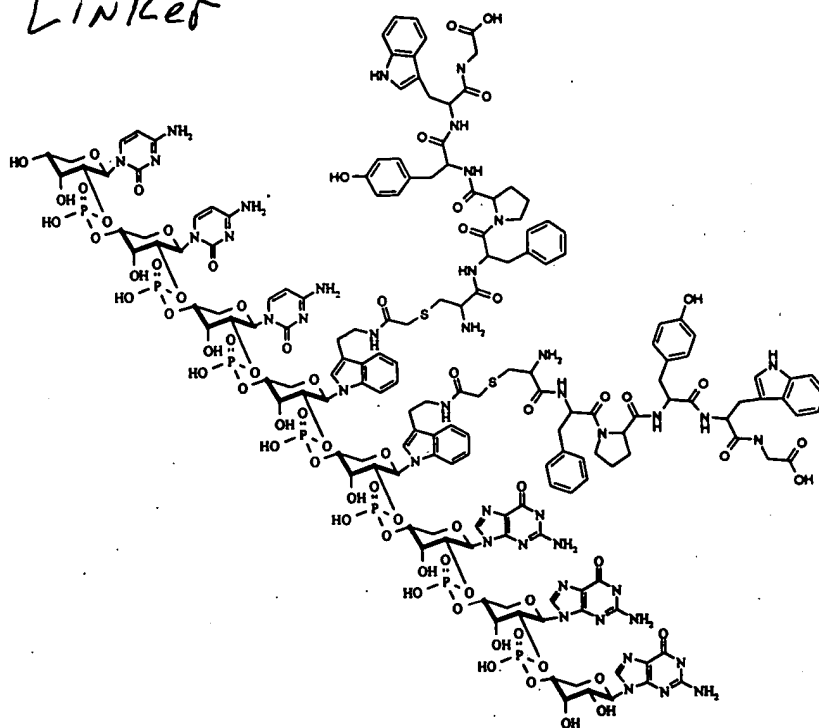


$T_m = 24^\circ\text{C}$
 Tris/HCl 0.01M; pH 7
 0.15 M NaCl
 $c = 10 \mu\text{M}$

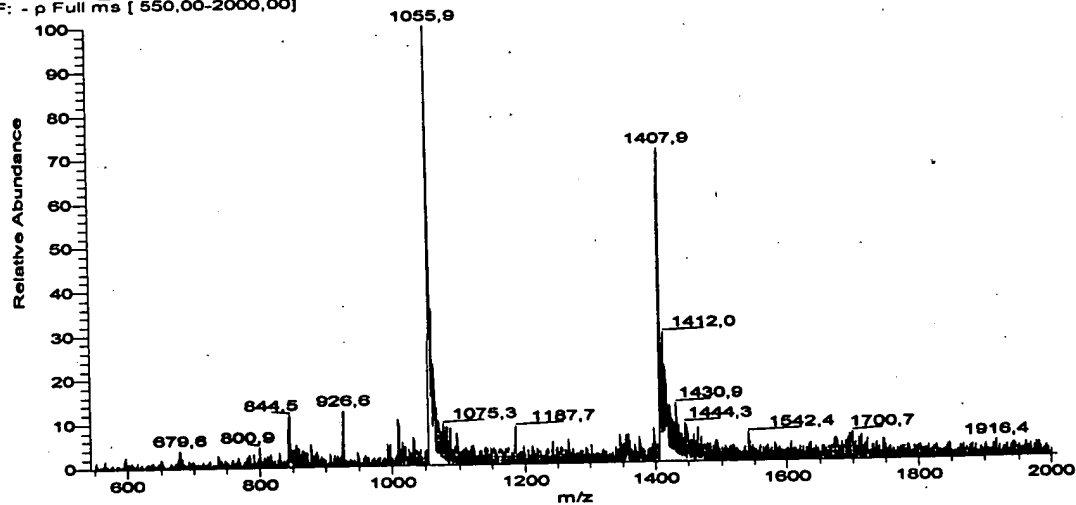


Thermodynamic data of the self pairing p-RNA oligomer $4' \text{ CCTrTrTrGG } 2'$

Figure 24- p-RNA with Two Peptides via Tryptamine Linker



990359es1_990504131638#92-111 RT: 3,77-4,57 AV: 20 NL: 4,68E3
F: - p Full ms [550,00-2000,00]



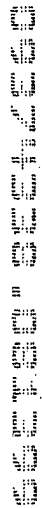
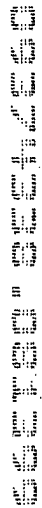
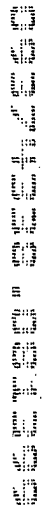
[illegible][illegible]

Figure 26 - Simulation of Measurements
with Noise

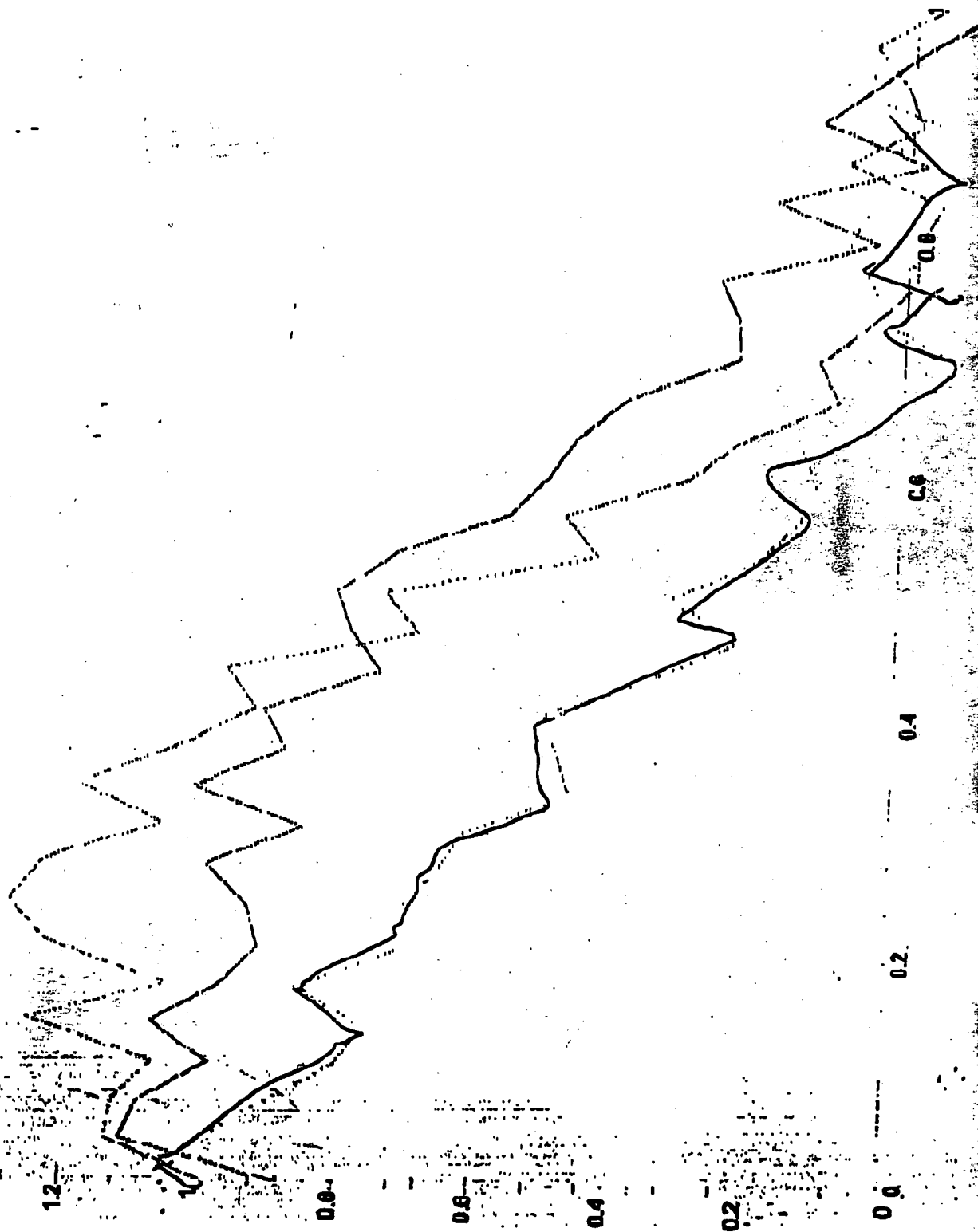


Figure 27 - Idealized Signal Development

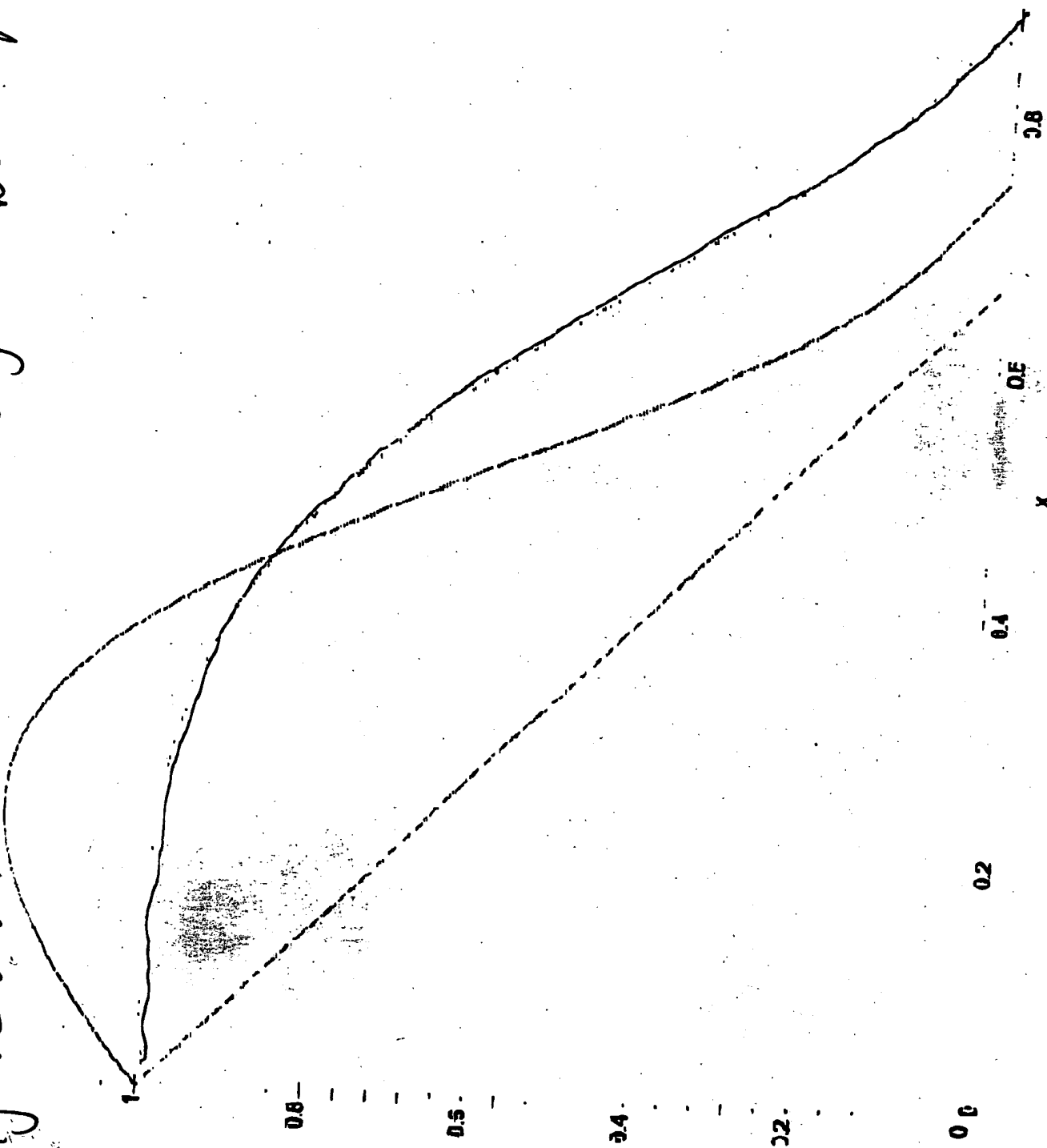


Figure 28

A scatter plot showing the relationship between Factor 1 (horizontal axis) and Factor 2 (vertical axis). The horizontal axis ranges from -2.5 to 1.0, and the vertical axis ranges from -0.8 to 0.6. The plot is divided into three regions by two vertical lines at approximately Factor 1 = -1.9 and Factor 1 = 0.3. The leftmost region (Factor 1 < -1.9) contains 7 positions with event of type II. The middle region (-1.9 < Factor 1 < 0.3) contains a dense cluster of 9 990 positions with event of type III. The rightmost region (Factor 1 > 0.3) contains 3 positions with event of type I.